	Gasoline	No. 2 Diesel	Biodiesel	CNG	Electricity	Ethanol (E85)	Hydrogen	LNG	Liquefied Petroleum Gas (LPG)	Methanol (M85)
Chemical Structure	C ₄ to C ₁₂	C ₁₀ to C ₂₀	Methyl esters of C ₁₆ -C ₁₈ fatty acids	CH ₄	N/A	CH₃CH₂OH	H_2	CH ₄	C ₃ H ₈	СН₃ОН
Cetane number	5 to 20	40 to 55	46 to 60	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Octane number	86 to 94	8 to 15	~25	120+	N/A	100	130+	120+	104	100
Main fuel source	Crude Oil	Crude Oil	Soy bean oil, waste cooking oil, animal fats, and rapeseed oil	Underground	Coal; however, nuclear, natural gas, hydroelectric, and renewable resources can also be used.	Corn, Grains, or agricultural waste	Natural Gas, Methanol, and other energy sources	Underground reserves	A by-product of petroleum refining or natural gas processing	Natural gas, coal, or, woody biomass
Energy Content per Gallon	109,000 - 125,000 Btu	128,000 - 130,000 Btu	117,000 - 120,000 Btu (compared to diesel #2)	33,000 - 38,000 Btu @ 3000 psi; 38,000 - 44,000 @ 3600 psi	N/A	~ 80,000 Btu	113,000 - 134,000 Btu	~73,500 Btu	~84,000 Btu	56,000 - 66,000 Btu
Energy Ratio Compared to Gasoline			1.1 to 1 or 90% (relative to diesel)	3.94 to 1 or 25%		1.42 to 1 or 70%		1.55 to 1 or 66%	1.36 to 1 or 74%	1.75 to 1 or 57%
Physical State	Liquid	Liquid	Liquid	Compressed Gas	N/A	Liquid	Compressed Gas or Liquid	Liquid	Liquid	Liquid
Types of vehicles available today	All types of vehicle classes.		Any vehicle that runs on diesel today—no modifications are needed for up to 5% blends. Many engines also compatible with up to 20% blends.		Neighborhood Electric Vehicles, Bicycles, Light- duty vehicles, medium and heavy duty trucks and buses.	flexible fuel vehicles that can be fueled with E85 (ethanol), gasoline, or any combination of the two fuels.	No vehicles are available for commercial sale yet, but some vehicles are being leased for demonstration purposes.	and buses.	Light-duty vehicles, which can be fueled with propane or gasoline, medium and heavy-duty trucks and buses that run on propane.	Mostly Heavy- duty buses are available.
Available Vehicles to purchase	See your local car/truck dealership	See your local car/truck dealership	Visit the Vehicle I	Buyer's Guide (http	o://www.ccities.do	e.gov/vbg/) to lear	n more about light	and heavy-duty a	Iternative fuel vehi	cles available
Vehicle Conversion Information		N/A	Visit the AFDC Web Site's Conversion page (http://www.afdc.doe.gov/afv/conversion.shtml) to learn more.							

Environmental Impacts of Burning the Fuel		and diesel vehicles are rapidly	particulate matter and global	CNG vehicles can demonstrate a reduction in ozone-forming emissions (CO and NO _x) compared to some conventional fuels; however, HC emissions may be increased.	EVs have zero tailpipe emissions; however, some amount of emissions can be contributed to power generation.	25% reduction in ozone-forming emissions (CO and	emissions for fuel cell-powered vehicles, and only	forming emissions (CO and NO _x)	demonstrate a 60% reduction in ozone-forming emissions (CO and NO _x) compared to	M-85 vehicles can demonstrate a 40% reduction in ozone-forming emissions (CO and NO _x) compared to reformulated gasoline.
Energy Security Impacts	Manufactured using mostly imported oil, which is not an energy secure option.	Manufactured using imported oil, which is not an energy secure option.	Biodiesel is domestically produced and has a fossil energy ratio of 3.3 to 1, which means that its fossil energy inputs are similar to those of petroleum.	CNG is domestically produced. The United States has vast natural gas reserves.	Electricity is generated mainly through coal fired power plants. Coal is the United States' most plentiful fossil energy resource and coal is our most economical and price stable fossil fuel.	domestically and it is renewable.	Hydrogen can help reduce U.S. dependence on foreign oil by being produced from renewable resources.	LNG is domestically produced and its typically costs less than gasoline and diesel fuels.	LPG is the most widely available alternative fuel with an estimated 3,400 refueling sites nationwide. The disadvantage of LPG is that 45% of the fuel in the U.S. is derived from oil.	Methanol can be domestically produced from renewable resources.
Fuel Availability	Available at all fueling stations.	Available at select fueling stations.	Available in bulk from an increasing number of suppliers. There are 22 states that have some biodiesel stations available to the public.	More than 1,100 CNG stations can be found across the country. California has the highest concentration of CNG stations. Home fueling will be available in the fall of 2003.	Most homes, government facilities, fleet garages, and businesses have adequate electrical capacity for charging, but, special hookup or upgrades may be required. More than 600 electric charging stations are available in California and Arizona.	Most of the E-85 fueling stations are located in the Midwest, but in all, approximately 150 stations are available in 23 states.	There are only a small number of hydrogen stations across the country. Most are available for private use only.	Public LNG stations are limited (only 35 nationally), LNG is available through several suppliers of cryogenic liquids.	LPG is the most accessible alternative fuel in the U.S. There are more than 3,300 stations nation wide.	Methanol remains a qualified alternative fuel as defined by EPAct, but it is not commonly used.
AFV Fueling Station Locations	N/A	N/A	Visit the AFDC W	eb Site's AFV Fue	eling Station Locat	or (http://www.afd	c.doe.gov/refueling	mapsite.shtml) t	o search for station	ons near you.
Infrastructure Information	N/A	N/A	Visit the AFDC W	<u>'eb Site's "Infrastru</u>	ucture Developme	nt Information and	Resources Page'	_		

Maintenance Issues			may be affected with higher- percent blends,	tanks require periodic inspection and certification.	Service requirements are expected to be reduced. No tune- ups, oil changes, timing belts, water pumps, radiators, or fuel injectors are required. However, the batteries must be replaced every 3-6 years.	Special lubricants may be required. Practices are very similar, if not identical, to those for conventionally fueled operations.	applications, maintenance should be very	tanks require periodic inspection and certification.	Some fleets report service lives that are 2-3 years longer, as well as extended intervals between required maintenance.	Special lubricants must be used as directed by the supplier and M-85- compatible replacement parts must be used.
	since people have learned to use it safely. Gasoline is not biodegradable though, so a spill	relatively safe fuel since people have learned to use it safely. Diesel is not biodegradable though, so a spill could pollute soil and water.	more biodegradable than conventional fuel, can be transported, delivered, and stored using the	Pressurized tanks have been designed to withstand severe impact, high external temperatures, and automotive environmental exposure.	OEM EVs meet all the same vehicle safety standards as conventional vehicles.	an explosive vapor	industrial safety record; codes and standards for consumer vehicle	procedures and equipment to properly store and dispense.	Adequate ventilation is important for fueling an LPG vehicle due to increased flammability of LPG. LPG tanks are 20 times more puncture resistant than gasoline tanks and can withstand high impact.	Methanol can form an explosive vapor in fuel tanks. In accidents; however, methanol is less dangerous than gasoline because its low evaporation speed keeps alcohol concentration in the air low and non explosive.
Average Cost/gge	You can get averag	e costs for all fuel ty	pes through the Alt	ernative Fuel Price	Report (www.afdc.c	loe.gov/documents/j	pricereport/pricerepo	orts.html)		